WHAT IS CLAIMED IS:

1. A system for nondestructive automated headspace analysis comprising:

A) a container conveyor configured to:

1) convey, along a movement path, a plurality of generally optically transparent sealed test containers each configured to contain a gas to be measured, through a pre-inspection region, an inspection region and a post-inspection region of said container conveyor; and

2) convey, along the movement path, at least one sealed reference container through said inspection region, the at least one sealed reference container containing a reference gas; and

B) a sensor located in said inspection region and comprising:

1) a laser source configured to emit a laser beam for absorption in the gas to be measured and the reference gas, said laser source further configured to emit the laser beam such that the laser beam intersects with the movement path;

2) a beam detector configured to detect the laser beam; and

3) a zone configured to accept the plurality of test containers and the at least one reference container conveyed by said container conveyor, said zone located between said detector and said laser source;

wherein said container conveyor is further configured to alternatingly convey at least one sealed test container of the plurality of sealed test containers and the at least one sealed reference container through said zone.

2. The system according to claim 1, wherein the at least one sealed reference container comprises a plurality of sealed reference containers.

3. The system according to claim 2, wherein:

1) the plurality of sealed reference containers comprises:

a) a first plurality of sealed reference containers corresponding to a first range of reference gas characteristics; and

b) a second plurality of sealed reference containers corresponding to a second range of reference gas characteristics;

2) said laser source comprises:

a) a first laser source configured to emit a first laser beam that intersects a movement path of the first plurality of sealed reference containers; and

b) a second laser source configured to emit a second laser beam that intersects a movement path of the second plurality of sealed reference containers; and

3) said detector comprises:

a) a first detector configured to detect the first laser beam; and

b) a second detector configured to detect the second laser beam.

4. The system according to claim 3, further comprising a processor configured to check, using the first and second pluralities of sealed reference containers, the calibration of the detector respectively over the first range of reference gas characteristics, and over the second range of reference gas characteristics.

5. The system according to claim 4, wherein the first and second characteristics are pressure and concentration.

6. The system according to claim 3, wherein the reference gas is a respective first and second different reference gas.

7. The system according to claim 2, wherein each sealed reference container of the plurality of reference containers contains a reference gas within a range of reference gas characteristics.

8. The system according to claim 7, further comprising a processor configured to check the calibration of the detector over the range using the plurality of reference containers.

9. The system according to claim 2, wherein:

said container conveyor comprises a rotatable starwheel located at the inspection region, said starwheel configured to accept the plurality of sealed test containers from said pre-inspection region, convey the at least one sealed test container and the at least one sealed reference container through said zone, and convey the plurality of sealed test containers to said post inspection region;

the plurality of sealed reference container is affixed to said starwheel; and

said zone is located at a portion of said starwheel.

10. The system according to claim 9, wherein said starwheel is configured to convey the at least one sealed test container through said zone at a slower rate than when said starwheel is not passing the at least one sealed test container through said zone.

11. The system according to claim 2, wherein said container conveyor is configured to convey the at least one sealed test container through said zone at a slower rate than when said container conveyor is not passing the at least one sealed test container through said zone.

12. The system according to claim 2, further comprising a purging system configured to purge ambient surroundings of the zone of the gas to be measured.

13. The system according to claim 9, wherein said starwheel is configured such that a single sealed test container of the plurality of sealed test containers is held between a pair of sealed reference containers of the plurality of sealed reference containers.

14. The system according to claim 13, wherein said starwheel is configured such that a single sealed reference container of the pair of sealed reference containers is held between a pair of sealed test containers of the plurality of sealed test containers.

15. The system according to claim 2, wherein:

said container conveyor comprises a linear feeder located at the inspection region, said linear feeder configured to accept the plurality of sealed test containers from said pre-inspection region, convey the at least one sealed test container and the at least one sealed reference container through said zone, and convey the plurality of sealed test containers to said post inspection region;

the plurality of sealed reference containers is affixed to said linear feeder; and

said zone is located at a portion of said linear feeder.

16. The system according to claim 15, wherein said linear feeder is configured to convey the at least one sealed test container through said zone at a slower rate than when said linear feeder is not passing the at least one sealed test container through said zone.

17. The system according to claim 2, wherein said laser source and said beam detector are configured to move in a direction substantially parallel to the movement path of the at least one sealed test container when the at least one sealed test container is conveyed through said zone.

18. A method for automated nondestructive headspace analysis comprising:

conveying, along a movement path, a plurality of generally optically transparent sealed test containers each configured to contain a gas to be measured, through a pre-inspection region, an inspection region and a post-inspection region of a container conveyor;

alternatingly conveying, along the movement path, the plurality of test containers, and at least one sealed reference container, through a zone of an inspection region of the container conveyor;

transmitting a laser beam in the zone of the inspection region, in a direction that intersects the movement path, and through a single sealed test container of the plurality of test containers, when the single sealed test container is conveyed through the zone;

transmitting the laser beam in the zone of the inspection region, in the direction that intersects the movement path, and through a single at least one sealed reference container, when the single sealed reference container is conveyed through the zone;

detecting, using a detector, the transmitted laser beam; and

conveying, along the movement path, the plurality of test containers through a post-inspection region of a container conveyor.

19. The method according to claim 18, wherein the at least one sealed reference container comprises a plurality of sealed reference containers.

20. The method according to claim 19, wherein:

the plurality of sealed reference containers comprises:

a) a first plurality of sealed reference containers corresponding to a first range of reference gas characteristics; and

b) a second plurality of sealed reference containers corresponding to a second range of reference gas characteristics; and

said transmitting the laser beam in the zone of the inspection region, in the direction that intersects the movement path, and through a single at least one sealed reference container, when the single sealed reference container is conveyed through the zone, comprises:

a) transmitting a first laser beam in the zone of the inspection region, and through a single sealed reference container of the first plurality of reference containers; and

b) transmitting a second laser beam in the zone of the inspection region, and through a single sealed reference container of the second plurality of reference containers.

21. The method according to claim 20, further comprising checking, using the first and second pluralities of sealed reference containers, the calibration of the detector respectively over the first range and over the second range.

22. The method according to claim 21, wherein the first and second characteristics are pressure and concentration.

23. The method according to claim 20, wherein the reference gas is a respective first and second different reference gas.

24. The method according to claim 19, wherein each sealed reference container of the plurality of reference containers contains a reference gas within a range of reference gas characteristics.

25. The method according to claim 24, further comprising checking the calibration of the detector over the range, using the plurality of sealed reference containers.

26. The method according to claim 24, wherein:

said alternately conveying comprises:

accepting, using a starwheel, the plurality of sealed test containers from the pre-inspection region;

conveying, using the starwheel, the at least one sealed test container and the at least one sealed reference container through the zone; and

conveying the plurality of sealed test containers to the post inspection region;

the plurality of sealed reference containers are affixed to the starwheel; and

the zone is located at a portion of the starwheel.

27. The method according to claim 26, wherein said conveying, using the starwheel, the at least one sealed test container and the at least one sealed reference container through the zone comprises conveying the at least one sealed test container through the zone at a slower rate than when the starwheel is not passing the at least one sealed test container through the zone.

28. The method according to claim 24, wherein said alternately conveying comprises conveying the at least one sealed test container through the zone at a slower rate than when the at least one sealed test container is not conveyed through the zone.

29. The method according to claim 24, further comprising purging ambient surroundings of the zone of the gas to be measured.

30. The method according to claim 26, further comprising arranging, on the starwheel, a single sealed test container of the plurality of sealed test containers between a pair of sealed reference containers of the plurality of sealed reference containers.

31. The method according to claim 30, further comprising arranging, on the starwheel, a single sealed reference container of the pair of sealed reference containers between a pair of sealed test containers of the plurality of sealed test containers.

32. The method according to claim 19, wherein:

said alternately conveying comprises:

accepting, using a linear conveyor, the plurality of sealed test containers from the pre-inspection region;

conveying, using the linear conveyor, the at least one sealed test container and the at least one sealed reference container through the zone; and

conveying the plurality of sealed test containers to the post inspection region; the plurality of sealed reference container being affixed to the linear conveyor; and the zone being located at a portion of the linear conveyor.

33. The method according to claim 19, wherein said conveying, using the linear conveyor, the at least one sealed test container and the at least one sealed reference container through the zone comprises conveying the at least one sealed test container through the zone at a slower rate than when the linear conveyor is not passing the at least one sealed test container through the zone.

34. The method according to claim 19, further comprising moving the laser beam and the beam detector in a direction substantially parallel to the movement path of the at least one sealed test container when the at least one sealed test container is conveyed through the zone.

35. The method according to claim 18, wherein the alternately conveying comprises:

accepting the plurality of sealed test containers from the pre-inspection region,

successively conveying the plurality of test containers and a plurality of the reference containers through the zone, such that the laser beam successively passes through the plurality of test containers and the plurality of reference containers, and

conveying the plurality of sealed test containers to the post inspection region.

36. The method according to claim 18, wherein the alternately conveying comprises:

accepting the plurality of sealed test containers from the pre-inspection region,

successively conveying the plurality of test containers and a single one of the at least one reference container through the zone, such that the laser beam successively passes through the plurality of test containers and the single reference container, and

conveying the plurality of sealed test containers to the post inspection region.

37. The method according to claim 18, wherein the alternately conveying comprises:

accepting the plurality of sealed test containers from the pre-inspection region,

successively conveying a single one of the plurality of test containers and a plurality of the reference containers through the zone, such that the laser beam successively passes through the single test container and the plurality of reference containers, and

conveying the plurality of sealed test containers to the post inspection region.

38. The method according to claim 18, wherein the alternately conveying comprises:

accepting the plurality of sealed test containers from the pre-inspection region,

successively conveying a single one of the plurality of test containers and a single one of the plurality of the reference containers through the zone, such that the laser beam successively passes through the single test container and the single reference container, and

conveying the plurality of sealed test containers to the post inspection region.